

# Ornithology



## Chapter Goals:

After completing this chapter, volunteers should be able to:

- Understand the causes of bird diversity.
- Understand and discuss the habits of bird migration.
- Identify the primary flyways of North America and Idaho.
- Explain bird's adaptations to environments and environmental changes.
- Develop an awareness of how bird populations are monitored and managed.
- Identify and communicate how birds function within ecosystems.
- Become aware of, and communicate, conservation concerns for birds.

## Why Study the Natural History of Birds?

Throughout the course of history, birds have been a favorite natural wonder of humans. From many of the earliest civilizations, such as Egypt and Rome, we have descriptions of birds. This is due in part to the ease with which they can be observed in a natural setting. Observation of birds has been used by many groups of humans, such as sailors looking for land and Native Americans to locate the direction to water. Birds also have been used in many capacities throughout history, both as a means of obtaining food (falconry) and as a major food source (eggs, young, and adults). Many birds also have been sought out as a means of decoration for costumes and head wear, and as pets for their bright colorations, singing ability, and/or ability to mimic human speech. The most notable of these birds are the parrots, but there are many other less known species of birds such as the Hill Myna (*Gracula religiosa*) of India and the Black-billed Magpie (*Pica pica*) of North America that are kept as pets. In more recent times, humans have begun to use bird watching and feeding as a leisure activity.



The American Kestrel, *Falco sparverius*, the smallest and most colorful falcon is commonly seen in town. These birds perch on posts or wire, scanning for mice.

From singing in the early mornings and evening to nesting in the backyard, birds appear less concerned about human activity than some other groups of animals. With this in mind, it is not

hard to understand why there are many books dedicated to the study of birds, whether they are field identification guides, photo journals, or works on the natural histories of a group such as hummingbirds. Guides and photo journals are made to enhance the enjoyment of many people who enjoy viewing birds, whether going on a birding vacation or watching birds at the backyard feeder.

Natural histories give a more intimate look at the lives of birds. Included in many natural histories are descriptions of nests, eggs, and preferred habitat types. This information provides a better understanding of each bird and its life requirements. Knowledge of migration patterns, breeding behavior, life span, and potential mortality factors, aid in predicting year to year changes in population abundance. Declining bird abundance has led to recent concern in Idaho for grassland birds such as the Burrowing Owl (*Athene cunicularia*) and Grasshopper Sparrow (*Ammodramus savannarum*). Idaho, in particular, has over fifty birds that are identified by the Idaho Comprehensive Wildlife Conservation Strategy as “Species of Greatest Conservation Need.” Among these are Mountain Quail (*Oreortyx pictus*), Harlequin Duck (*Histrionicus histrionicus*), and Flammulated Owl (*Otus flammeolus*). With the understanding of the natural histories of all birds, changes in land management practices have greatly improved the chances of bringing species back from the brink of extinction and can prevent species from becoming rare in the future.

The continued study of the natural history of bird species will give greater insight into how anthropogenic (human-centered) changes affect birds. Among these changes is an increase in urban areas; with this increase there have been some dramatic changes in the populations of some bird species. The Eurasian Collared-Dove (*Streptopelia decaocto*) formally resided as a non-native, invasive species in Florida during the mid-1980’s. However, these birds have expanded their range westward and into Idaho. Now their numbers are growing. With this change in distribution pattern, it is important to understand how the change in distribution is affecting other dove species.

## **Diversity of Birds**

Birds are an amazingly diverse group of animals. Worldwide, ornithologists estimate that there are nearly 10,000 species of birds. Birds (Class Aves) are separated into 29 major taxonomic groups, or Orders. The birds in each Order are a lineage of related species. The diversity of birds reflects their evolutionary adaptation to a great variety of habitats and modes of life. Birds occupy forests, fields, deserts, shorelines and nearly every habitat in-between. A diversity of bill sizes and shapes, legs, feet, wings, modes of locomotion, diets, behaviors, and physiologies lend to the many ecological opportunities for birds. Due to its size and rich mixture of avifauna, Idaho demonstrates the vast possibilities of avian diversity and complexity. Idaho hosts approximately 400 species of birds in a unique blend of river, mountain, forest, and desert habitat, and is among

the first to offer a truly statewide birding trail - a connected network of the best places to view birds in the state - that totals approximately 2,000 miles. For these reasons, Idaho is attracting ornithologists and birdwatchers from across the nation.

To examine bird diversity, we can separate birds into six categories based on their lifestyles and habitat. The categories include:

- songbirds (e.g. thrushes, warblers, sparrows, and wrens);
- waterbirds (e.g. egrets, grebes, rails, herons, gulls, and pelicans);
- waterfowl (e.g. ducks, geese, and swans);
- shorebirds (e.g. sandpipers, plovers, and curlews);
- raptors (e.g. hawks, eagles, and owls); and
- upland birds (e.g. grouse, quail, turkeys, pigeons and doves).



Red-tailed Hawk, *Buteo jamaicensis*, returns to Idaho early in the spring to nest. The distinct reddish-brown tail can also be light colored, making it difficult to identify with this feature alone. Red-tailed hawks have a black leading edge on the underside of their wing. Photo courtesy, Jack Cafferty, The Peregrine Fund.

Similarly, we can separate birds into categories based on their food habits. Birds can be plant eaters and eat flowers, pollen and nectar. Other plant eaters feed on fruits and seeds, while others eat fibrous plant materials including leaves and stems. Species that eat animals may be insectivorous, eating insects and/or small invertebrates. Animal eaters also may be strictly piscivorous and feed on fish, amphibians, and larger aquatic invertebrates. Some animal eaters are carnivorous and feed on warm-blooded prey. Birds also can be either scavengers or omnivores. Within a taxa (Order, Family, or Genus), food habits differ greatly.

Although the above two methods of separating groups of birds are artificial and not based on taxonomic relationships, they help us understand the diversity of birds and their habitats.

## Why do Different Birds Live in Different Places?

Birds occupy habitats that meet their needs for various resources; for food, water, space, and nesting locations and materials. Generally, different birds match, or correspond to, different environments. They “fit” into a particular environment due to past conditions of the environment and the characteristics passed on through generations of that bird species. They inhabit environments having favorable conditions for life. For example, the Flammulated Owl (*Megascops flammeolus*), a species identified by the Idaho Comprehensive Wildlife Conservation Strategy as a “Species of Greatest Conservation Need,” is suffering from habitat loss due to widespread anthropogenic manipulations of their breeding habitat. Dependent upon

transition coniferous forests and mature ponderosa pine stands, these dwindling habitats provide the necessary resources for the owls. In addition, as insectivores, Flammulated Owls are affected by changes in forest structure that may impact forest insect abundance during the breeding season.

Species select environments that meet their habitat requirements. Shorebirds, like American Avocets (*Recurvirostra americana*), are found along marshes and on mudflats where they forage for aquatic invertebrates. Swallows, like the Violet-green Swallow (*Tachycineta thalassina*), spend large amounts of time in the open rural areas and grasslands of Idaho where they forage on insects. The number of specific examples is nearly endless, as each species fits a particular portion or type of environment.

## Migration

Although birds have specific adaptations for a particular environment, they also must tolerate the changes their environment experiences—seasonal changes, long-term directional changes, and erratic changes. More than any other group of animals, birds deal with seasonal changes of environments by extraordinary feats of long distance migration. Migration is closely timed to the patterns of seasonal changes and is a yearly cycle. The driving force behind migration is the availability of resources, mainly more stable food source. Birds migrate to escape unfavorable climates, where food becomes difficult to locate, and exploit favorable conditions in other climates where resources are plentiful. Some species that nest (breed) in the temperate climates of Canada and the United States, migrate to Central and South America and the Caribbean during the winter. These species are called Neotropical migrants. Others species relocate to the Gulf Coast states of the southern U.S. Flying south allows these birds to escape the physiological stresses of winter, take advantage of food supplies and the milder climate of the southern regions during winter months. The migrants return north in the spring to exploit the productive temperate regions abundant food supplies, longer daylight hours of the northern latitudes, and less competition for nesting space. Some migrants travel greater distances than others to reach their wintering or nesting grounds—from just a few miles to thousands of miles.



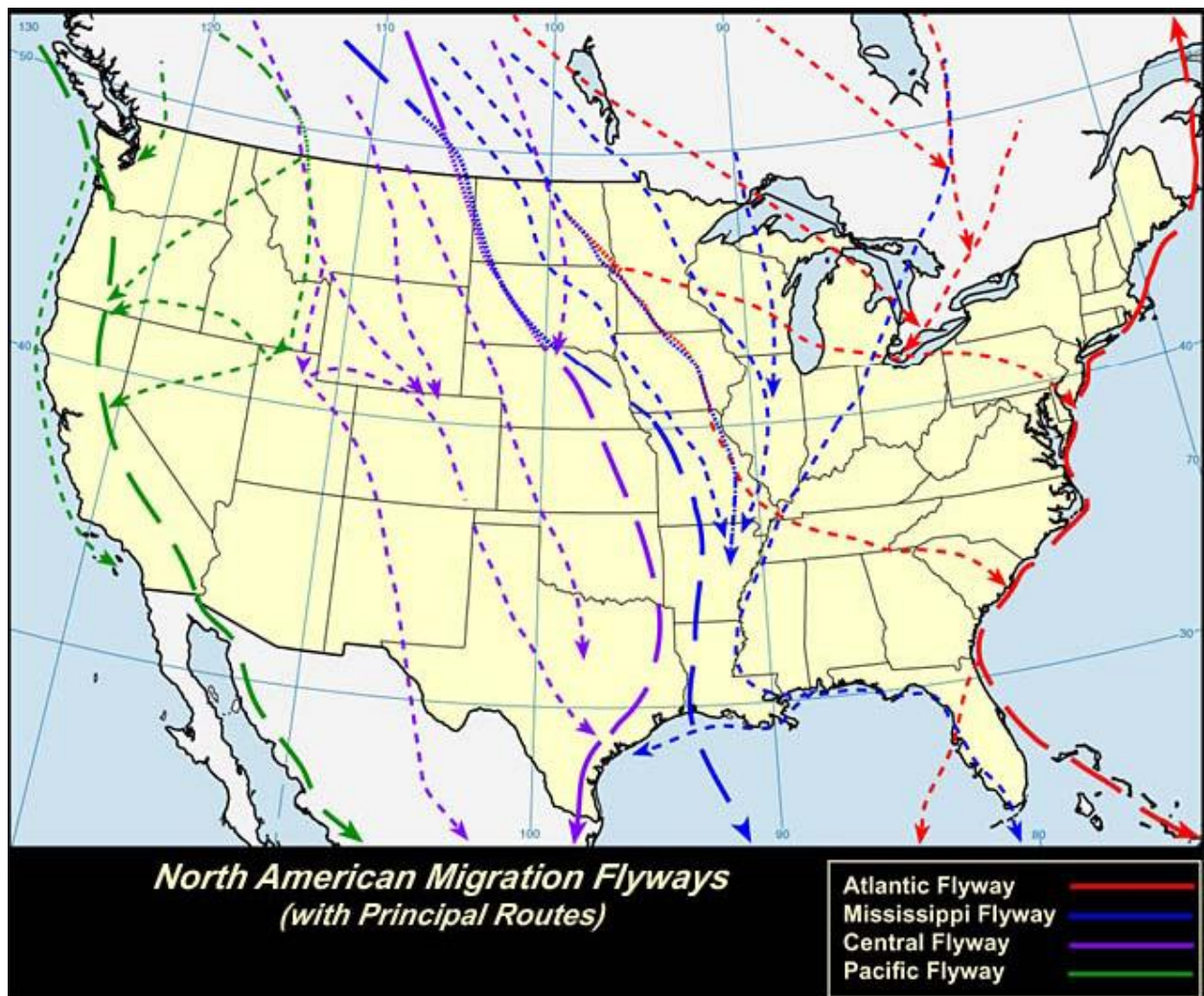
Bald Eagles were removed from the Federal Endangered Species List in 2007. Photo by Laura Whitehouse, USFWS.



The Idaho state is the Mountain Bluebird. Arriving in early March, this migrant is a cavity nester. Snags and natural holes in trees serve as nesting sites. Bluebirds benefit from nesting boxes and will take to them readily. Photo by IDFG.



Of more than 800 species of birds that occur regularly in North America, approximately 400 can be found in Idaho at one time or another throughout the year. Most of Idaho's birds are regular breeders (243 species), whereas a handful occur in the state only in the winter or during migration. Approximately half of Idaho's breeding bird species are considered migrants - that is, they come to Idaho only to nest and raise a family. Idaho is situated along the Pacific Flyway, a principle route used by North American birds. These species may spend their winters in states to the south (e.g., California, Arizona, Texas) or may travel thousands of miles to countries in Central and South America, (e.g., Mexico, Costa Rica, Venezuela, and Brazil). Species traveling south of the U.S.-Mexico border are called Neotropical migratory birds and are of particular interest to ornithologists because so many of them are experiencing significant population declines. Due in part to these declines, a number of Idaho's birds have been classified as priority species by [Idaho Partners in Flight](#).



Some areas are important because they serve as “migrant traps” which provide shelter for migrants following a “fallout” episode. When southward migrating birds encounter storms or strong headwinds, they stop their migration abruptly and seek shelter in the forests and riparian areas, appearing to “fall out” of the sky. One such place is the Boise Ridge, just north of downtown Boise. The ridge marks the southern end of 7

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and coniferous forest, provides an important migration stopover area for an abundance and variety of western migratory songbirds.

## How do Birds Cope with Changes in Their Ecosystem?

Organisms operate in their environment under specific ecological constraints. Bird populations are limited by four factors: habitat, climate, food and water, disease and parasites. Organisms, by nature, change the ecosystem in which they live. An ecosystem consists of both the physical environment and the biological communities. Organisms affect their ecosystem by altering conditions, adding or subtracting resources, and interacting with other individuals. The physical environment itself may change due to abiotic factors. For example, climatic variations may affect temperature and food availability. Within bird communities, a number of species interactions are at work to establish community structure, including competition and predation. We'll examine how birds deal with these and other "pressures" within their environment.

### Competition

Competition occurs when the use or defense of a resource by one individual reduces its availability to other individuals. This may be the single most important factor responsible for determining community structure. "**Interference competition**" can be acted out as aggression towards other individuals so that one individual or species is excluded, or more commonly as "**exploitation competition**" where all individuals have equal access to a resource but differ in their ability (speed or efficiency) to exploit that resource.

Birds compete for a number of different resources including food supplies, nest sites, nest materials, mates, and territories. Often, the territories contain one or more of the other resources. To cope with competition for food supplies, some species participate in "**resource partitioning**." Different species either feed in different parts of their shared habitat (as do many warblers having similar habitat preferences), or take food of different sizes. If individuals do not share overlapping resources, they will "**defend territories**" as a strategy for reducing competition. Some types of territories are simple and are defended for a single resource, such as the feeding territories of hummingbirds. However, many breeding territories include food, mates and nest sites. Territory size depends on population density and on the availability of resources. Territories can be very small, such as the nest and a small area around it in gull colonies, or quite extensive such as the territories of Bald Eagles (*Haliaeetus leucocephalus*).

Competitive encounters elicit antagonistic behavior. However, most birds will go through much effort to avoid physical contact with another individual. The encounters involve displays of threat or submission. In defending territories, birds advertise their presence vocally.

## Predation

Many strategies, such as mobbing, calls and displays, flocking, selection for small clutches and cavity nesting and colonial nesting exist as strategies to deter predators.

**“Mobbing”** is one of the most obvious displays of anti-predator aggression. Small groups of songbirds can be seen chasing and calling around a hawk or owl. This behavior is most common around breeding grounds. The purpose of this behavior is to divert the predator away from nesting areas or simply to confuse the predator and urge it on its way. **“Alarm calls,”** associated with mobbing function, alert other individuals of the same species and other species of the presence of a predator. Other birds may join in the mobbing, or are protected by being put on alert. Why the predators do not turn on the mobbing birds and attack is not known. It may be that these predators rely on surprise as an integral part of their hunting strategy or it may just be that the predators are so much larger than the mobbers that it would be an energy drain to try to get revenge on each one.



Another conspicuous anti-predator strategy is the exaggerated **“injury display.”** For example, instead of remaining quiet and on the nest, an adult Killdeer (*Charadrius vociferous*) will feign a broken wing or tail while fluttering away from the nest with the intent of diverting the predator from the nest or young. Similarly, some birds will assume a “crouching” position and dart back and forth across the ground doing a “rodent-run” maneuver to distract the predator. Single species and multispecies **“flocks”** have distinct advantages when predators pose a threat. Birds in flocks can focus on feeding and relax. Because many individuals are present, flocks have better predator detection than individuals. In addition, from an individual bird’s perspective, their chances of being eaten by a predator are decreased, if they are in a flock. Birds within a flock also communicate with each other. Alarm calls alert others and remove the possibility of a surprise attack by the predator. Large flocks also cause predator confusion upon flushing.



Killdeer often display a wing injury to distract predators from their eggs on the ground.

Another strategy to avoid predation is **“cavity nesting.”** One half of all Orders of birds build nests inside cavities or holes. Cavity nests are safer from predators than open nests or those constructed on the ground. Nest placement and construction is important, as predation is the



greatest cause of nesting failure by birds. “**Clutch size**” also seems to be related to the type of nest built by a particular species. Species that nest in holes or cavities tend to have a greater number of eggs per clutch. Some research has suggested that, over time, increased predation has selected for smaller clutch sizes. Birds that lay small clutches require less time for egg laying, during a period when they are particularly vulnerable. Smaller clutches are less noisy and conspicuous to predators. In addition, laying a small clutch allows birds to risk fewer eggs at a time to predation and keeps available the possibility of re-nesting. Anti-predator behavior associated with nesting includes removal of eggshells from the nest by adults. Clean nests are less likely to attract predators.

Like birds in large flocks, “**colonial nesting**” birds have an advantage in predator detection. It appears that some birds form colonies in response to food sources, while other species are colonial nesters due to the predator protection afforded by the lifestyle. Yet, some colonies expose the birds to an even greater predation risk. Colonial nesting is a widespread habit among the various taxonomic groups of birds. Gulls, swallows, penguins and herons participate in this behavior. Colonial nesters can detect predators more easily and can form larger mobs to threaten advancing predators. Predation is heavier on the nests at the outer edges of a colony than those on the interior. Usually, more experienced, older birds acquire central nesting sites. “**Predator saturation**” may occur with colonial breeders. Eggs and young birds represent a significant food resource to predators. When so many nestlings are available for such a brief time, predators may be unable to build their populations to a large enough size to completely benefit from this overwhelming food source.



Gulls are colony nesters. This colony is located on an island of Mormon Reservoir in south central Idaho. The island protects them from predators and nesting in large groups allows them to defend nests together. Photo courtesy, Colleen Moulton, IDFG.

## Parasitism and Disease

Birds are host to quite a variety of parasites and microscopic pathogens like bacteria and viruses. Common bird parasite residents include chewing lice that live on dandruff, blood, or other fluids, fleas, louse flies, relatives of bed bugs, ticks, and mites. Internal worms and flukes also are common.

Although little is known about the impact of such organisms on most bird populations, ecto-parasites (those living externally on a bird) can increase nestling mortality in birds living in large

colonies. Such is the case with Cliff Swallow (*Hirundo pyrrhonto*) nestlings where bedbug-like parasites infest the nests and feed on fledglings.

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To combat parasites and pathogens, some birds practice “**nest sanitation**” by removing fecal packets produced by nestlings. Other species carefully select nest materials that are known for their ability to inhibit bacteria and ecto-parasites. For example, European Starlings (*Sturnus vulgaris*) select green plants, such as yarrow, as nest lining. The sprigs of green plants are added to the nest before hatching and continue to have fumigant effects. Starlings also remove fecal packets of their young but only for a limited time early in the life of the nestlings. This species is particularly hardy and can withstand large populations of nest mites.

Some species reuse old nests, while others build new nests rather than risk the threat of parasites. In large colonies, where parasites are a greater problem than in small colonies, Cliff Swallows prefer to construct new nests. Swallows also may move the entire colony to a new site to escape the threat of parasites.

Birds that frequent backyard bird feeders may be susceptible to some diseases that are spread through shared food or by conditions that encourage disease (damp, contaminated food or fecal droppings). Four common diseases are salmonellosis, trichomoniasis, aspergillosis, and avian pox.

- **Salmonellosis** is caused by a group of bacteria that can spread throughout the body causing abscesses that form on the lining of the esophagus as part of the infection process. The bacteria are passed from the infected bird through fecal droppings. This is a problem at bird feeders where droppings can easily contaminate food. Salmonellosis is seen more frequently than any other bird feeder disease. Prevent contamination by droppings by cleaning feeders regularly and using fresh, dry stored food.
- **Trichomoniasis** comes from a group of protozoan parasites that afflict pigeons and doves. The Mourning Dove is very susceptible. Trichomoniasis typically causes sores in the mouth and throat. Unable to swallow, the bird drops the contaminated food or water, leaving it for other birds to consume, thus spreading the disease.
- **Aspergillosis** is a fungus that grows on damp feed and in the debris beneath the feeder. The bird inhales the fungal spores and the fungus spreads through the lungs and air sacs causing pneumonia and bronchitis.
- **Avian pox** is more noticeable than other diseases due to the wart-like growths on the featherless surfaces of a bird’s face, wings, legs, and feet. Direct contact with infected

birds spreads the virus. Shed viruses are picked up by healthy birds from food or feeders, or by insects that mechanically carry the virus on their body. Disease cannot be overlooked as a complication of backyard bird feeding. Sick birds are less alert and less active. They feed less and may cower on a feeder and be hesitant to fly. To reduce the risk of spreading disease at feeders, it is important to provide adequate space around feeders, clean waste year to year with changes in weather.



Avian Pox  
Courtesy of USGS

These common birdfeeder diseases can be prevented by washing bird feeders in warm soapy water every 2-3 weeks, rinsing with a diluted bleach solution, rinsing, and drying thoroughly before refilling. Also, keeping bird seed dry and away from rodents will help reduce these diseases. Hummingbird feeders need to be cleaned every week in very warm weather. Four parts water to one part sugar should be used. No food coloring or honey should be used. Moving bird feeder locations occasionally may also help prevent droppings from accumulating and spreading diseases.

### **Habitat Alteration**

Habitat alteration is currently one of the most contentious issues related to many bird species today. Declining numbers of many species of birds is due in part to the changes that are occurring in their given habitat. The changes include loss of preferred nesting areas and decrease or increase in resources. Many alterations in habitat have negatively affected bird populations. However, in the case of some species, changes in habitat have increased numbers. One example, the Lesser Snow Goose (*Chen caerulescens chencaerulescens*) whose numbers have dramatically increased in the past 20 years. While the numbers of the Lesser Snow Goose have increased, there is growing concern about how the species is affecting its own summer/breeding habitat due to the foraging habits of this species and what affect this might be having on other species sharing the same summer/breeding range.

Habitat alteration is being used in management practices to restore areas back to what was thought to be historical habitat. This manipulation of habitat is being used in the attempted recovery of many grassland birds. One method that is being used to manipulate/restore habitat is the reintroduction of fire into ecosystem management of grasslands. For example, increasing fire frequency in some sites in the Great Basin is resulting in the suppression of western juniper and pinyon-juniper in mountain big sagebrush and Idaho fescue habitat. Prescribed fire is also being used to improve the health, vigor and sustainability of existing aspen stands in central Idaho. Aspen declines throughout large portions of the West have federal forest managers concerned.

One of the most concerning habitat alterations is an increased amount of urbanization. Increases in urban acreage have led to fragmented habitat, which in many cases is detrimental to bird populations. Many birds need to have large contiguous tracts of land; these include many grassland and woodland bird species. Fragmentation of habitat leads to what is called “edge effect.” For some wildlife species, increased edge provides more accessibility to resources, but for birds, these edges become predator corridors. This leads to increased mortality and, in many cases, decreased nest success, both affecting the overall population numbers of birds.

### **Food Availability**

A bird’s food supply is not a constant, unchanging resource. Food supplies—whether they are plant or animal—change from season to season and year to year with changes in weather. Population size, and the growth of a population, is limited by the quantity and quality of available food. Abundant food supplies do not present a problem. However, birds may engage in particular behaviors to deal with food shortages or anticipated food shortages.

In preparation for winter weather, Gray Jays (*Perisoreus canadensis*) store food in special places to save for later. They store the less perishable items such as berries, insects and mushrooms by coating them with sticky saliva from special glands. These stick balls of saliva-covered food are tucked behind flakes of bark, under tufts of lichen, in the foliage or in forks of trees. Other birds also save food for later. The Loggerhead Shrike (*Lanius ludovicianus*), known for impaling prey on cactuses and barbed wire, will do the same to prey items intended for later meals. Birds in the families Sittidae, Paridae, and Corvidae commonly create seed caches. They take advantage of temporary food surpluses by accumulating “leftovers” for time of food shortage. In contrast to food gathering, some species disperse in great numbers over long distances to escape widespread food shortage.

Species that defend territories for food resources may alter the territory size depending on food availability. In cases of food shortage or low-quality food, birds may expand their feeding territory. In species with extended family units, the birds may be engaged in cooperative feeding of the young when food is limited or of poor quality for a given season.

Environmental conditions, like food supply, can affect the timing of reproduction in birds. When food is not adequate, females can delay egg production, thereby limiting clutch size. From a different perspective, however, evidence of abundant food very early in the spring can trigger early reproduction. Year round availability of high-quality food allows many tropical species to engage in two breeding seasons annually. If food is insufficient, parents may not be able to nourish their chicks adequately. The smallest chicks of a brood may starve when older, larger nest-mates out-compete them for food.



Some species may take advantage of abundant food resources. Sufficient, predictable food supplies may cause individuals in some populations of a species, but not others, to mate with multiple females. Generally, food resources that are either clumped and/or defended in a territory lead to multiple mates.

### **Temperature Changes**

Birds are endothermic, meaning they generate internal heat to regulate their body temperature. They are able to maintain relatively high body temperatures throughout a wide range of air temperatures. This ability allows birds to inhabit environments with extremes in climate—tropics, temperate, and polar zones. Birds regulate their body temperature, “thermoregulation,” when ambient temperatures are outside their thermo neutral range —when temperatures are either too warm or too cool. Mechanisms must be in place to aid in heat loss and birds must take in sufficient energy (food) for metabolic heat production. Birds use both behavioral and physiological means for thermoregulation.

Birds can be susceptible to heat stress. To manage this problem, birds use panting to cool themselves by increasing their respiratory rate to rapid, open-mouth breathing. This results in water loss from the surfaces of the mouth, nasal passages and lungs. Sweat glands are not present in birds, so ridding the body of water by sweating is not an option. It is also likely the apteria (areas of the body from which feathers do not grow) and other un-feathered surfaces (legs) aid in heat loss.

Birds may engage in a variety of behaviors to stay warm. Many birds select microclimates that provide warmth or shelter from the elements. Some nest sites, holes and burrows protect birds from the cooling effects of wind. Small birds, having a higher body surface area to mass ratio, may be particularly vulnerable to heat loss and therefore seek protection. Other birds may seek the warmth and protection provided by other individuals. Northern Bobwhite (*Colinus virginianus*) are known to huddle together. Some birds add additional feathers to their body to stay warm. Another way to stay warm is to “fluff” feathers for better insulation. This creates air pockets between the feathers and the skin that help retain heat. Birds can also stay warm by shivering. Humans do this too, but for birds shivering helps maintain a temperature of about 106-109 degrees. Those that can survive the coldest nights of winter have a special behavioral adaptation called “torpor.” During torpor, metabolism slows down, body temperature lowers and heart rate reduces to conserve energy. Finally, in order to maintain body temperature at a level that will keep the bird warm, a bird must eat plenty of food that is high in fat to boost metabolism. Birds spend most of their time searching for food in order to keep warm and stay alive.

# How do Birds Function in Ecosystems?

Since nothing in nature stands alone, birds, like all other organisms, are connected in some way to individuals of the same and other species. The presence of a particular bird in an ecosystem affects the diversity of the whole bird community and determines which other species can coexist in the same area. Birds affect the vegetation of an ecosystem, the invertebrate populations of an ecosystem and the vertebrate populations of an ecosystem. On a smaller scale, organisms like fungi and microbes also are important to the ecosystem dynamics. Birds, due to their great diversity, have many roles within an ecosystem. They are foragers, predators, and prey. Additionally, they have evolved special relationships with other species. Some birds are plant pollinators and some are hosts to parasites.

## Predators

The role of birds as predator is one that helps keep populations of prey species from becoming too abundant, which in an extreme case can cause starvation of the prey species. Predators also help to improve the overall health of a species by removing sick, old, and injured animals from the population. By removing these components of the population, those that remain can more easily obtain resources that ensure the “most fit” birds are able to reproduce. Predators are a vital component of ecosystems, either of which many bird species function as exclusively or in a limited capacity throughout the course of their life.

Raptors such as hawks, owls, and eagles, with their large talons and sharp beaks, are readily identified as predators. Raptors prey on many different types of organisms from insects (American Kestrel; *Falco sparverius*) to birds (Peregrine Falcon; *Falco peregrinus*) and fish (Osprey; *Pandion haliaetus*) to animals as large as Pronghorn Antelope fawns (Golden Eagle; *Aquila chrysaetos*). There are several other bird species that function in the role of predator that are not as easily recognized. These predators range from the Common Merganser (*Mergus merganser*), which feeds on fish, to Black-Chinned Hummingbird (*Archilochus alexandri*), which feeds its young insects.

## Prey

Prey species are those that serve as a food source for other species in a given ecosystem. Many species of birds are considered prey species, which may include having eggs taken and eaten from nests, to adults serving as a food source for larger predators, which includes reptiles, mammals, and other birds. Most predation on birds occurs in the early stages of life as either an egg or nestling. Many adult birds are a heavily used prey species for many other organisms in the ecosystem. Some of the better-known prey species are sought out by humans as food sources. Collectively known as game birds, this group includes, but is not limited to, Ring-Necked Pheasant (*Phasianus colchicus*), Northern Bobwhite and Wild Turkey (*Meleagris gallapavo*).

## Seed Dispersal

Birds also function in the role of seed disperser. This occurs at all levels of the ecosystems. Birds that have thick bills, such as Finches, Grosbeaks and Sparrows specifically exploit seeds as a food source. Most bird species that exploit seeds as a food source cannot process all the seeds consumed. Seeds are passed out of their system from within sight of the plant where they were consumed to several hundred miles away during migration. Some Corvids such as Blue Jays (*Cyanocitta cristata*) and Clark's Nutcrackers (*Nucifraga columbiana*) actually store seeds in the ground for a winter food source. Even with exceptional spatial memories, birds, like squirrels, cannot consume all of the seeds that are stored over the course of the winter. Thus, they unknowingly plant seeds from many different plant species.

## Pollinators

The role of birds as pollinators in an ecosystem has been well documented. Many species of birds function in the role of pollinators; among these are hummingbirds and orioles. Both groups rely on nectar as a primary food source, collecting pollen on their heads or backs and disperse this to other flowers while feeding. This exchange of pollen ensures that plants produce viable offspring, which includes fruits, nuts and seeds. All of these plant offspring are then used by other organisms, including birds, as a food source later in the year.



This hummingbird was banded by the Idaho Bird Observatory. The photo was taken just before release. Hummingbirds join bees, flies, and beetles as important pollinators for Idaho's native plants. Photo courtesy, Deniz Aygen, IBO.

## What are some conservation concerns for birds?

There are many conservation concerns for birds today. The greatest are declining numbers of many species of birds and loss of habitats associated with these same species. Many organizations, both public and private, are involved with both of these aspects in conservation.

## How are Birds Monitored?

Birds are most often monitored through survey methods such as point counts, transects, and observation; each of which can be easily conducted.

### Point Counts

Point counts are conducted from a set of pre-determined points by a surveyor. While at these points, the surveyor will count the number of birds of each species observed and heard within a given area. These counts are then used to determine what species are present and within what habitats the birds are found. Point counts are also used to determine population trends and local

bird densities of the survey area. Many point counts are conducted on an annual basis to better understand how bird numbers and bird diversity are doing on a year to year basis.

### **Transects**

Transects are another survey method commonly employed to count the number of birds, as well as the number of bird species, along a survey line. Transects are generally linear with set limits on the distance for which birds are to be counted.

Dimensions of the transect are set prior to conducting the survey by those doing the survey.

Length can range from under 100 yards to several miles with the width also being variable but generally from 15–20 meters on either side of the transect's center line. The way in which birds are counted depends on the goal of the person conducting the census. If it is to determine what species are present in the area, both songs and visual identification count toward the number of bird species on that particular line. Some transects are used only to count those birds that appear to be using the particular habitat and may only count the number of visually-identified birds that are within the set boundaries performing activities such as perching and feeding.

Some transects are conducted annually to see if there are fluctuations in the number of birds and bird species from year to year. This method is commonly employed in areas where there is concern about specific bird species. Transects are used by the Idaho Department of Fish and Game to estimate forest grouse populations, help set hunting limits and compare data from year to year.

### **Rare Bird Reports**

Rare bird reports are used to document the occurrence of birds outside of what is thought to be their accepted range. Rare bird sightings have to be authenticated by local Audubon Societies to determine if each sighting is valid. With the occurrence of a rare bird sighting, many people, anxious to add a particular bird to their life list, will drive several hundred miles for a chance to see the bird.

### **Public Involvement**

Additionally, several survey methods are conducted annually throughout the U. S. These include the Audubon Society's Christmas Bird Count, the Breeding Bird Survey, and the Great Backyard Bird Count, which are conducted annually at different times of the year. All of these surveys rely on the participation of the general public and would make a great Master Naturalist volunteer project. With these counts, volunteers are asked to survey birds that are in their area and give the



A California gull colony count at Mormon Reservoir.  
Photo courtesy, Colleen Moulton, IDFG.



number of bird species and individuals of each species they observe in a given time period or along a given route. These survey methods are used to monitor population trends of bird species at a given time of the year and to determine if bird species are increasing or declining overtime.

Visit [www.idahobirds.net](http://www.idahobirds.net) for more information on Idaho's birds.

## **Suggested Readings and Additional Resources**

Books and other resources covering birds are numerous. Many can be located off the website resources listed.

American Birding Association <http://www.americanbirding.org>

Cornell Lab of Ornithology <http://www.ornith.conrell.edu/>

Idaho Birding Trail Website <http://www.idahobirdingtrail.org>

Idaho Bird Observatory Website <http://www.boisestate.edu/biology/ibo/>

National Audubon Society <http://www.audubon.org/>

Electronic Resources of Ornithology <http://www.chebucto.ns.ca/Environment/NHR/bird.html>

Professional Ornithological Societies

American Ornithologist's Union <http://www.aou.org/Association of Field Ornithology>  
<http://www.afonet.org/index.html>

Cooper Ornithological Society <http://www.cooper.org/>

Wilson Ornithological Society <http://biology.boisestate.edu/raptor/>

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